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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/705,994	11/13/2003	Hiroshi Kawai	36856.1146	6522
54066	7590	10/04/2005		
KEATING & BENNETT, LLP 8180 GREENSBORO DRIVE SUITE 850 MCLEAN, VA 22102			EXAMINER ROJAS, BERNARD	
			ART UNIT	PAPER NUMBER
			2832	

DATE MAILED: 10/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/705,994

Applicant(s)

KAWAI, HIROSHI

Examiner

Bernard Rojas

Art Unit

2832

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 12 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) 7, 11, 14 and 19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 9, 10, 12, 13 and 16-18 is/are rejected.
- 7) ☒ Claim(s) 8 and 15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date: _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>11132003 05062004</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

Claims 7, 11, 14 and 19 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Embodiments, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 07/12/05.

### ***Specification***

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant

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regards as the invention. The claim recites "an electrical length for the RF signal-conducting unit sandwiched between the plurality of movable electrodes is such that an amplitude of a combined signal composed of RF signals reflected at positions of the RF signal-conducting unit facing the plurality of movable electrodes is less than an amplitude of each of signals reflected at positions of the RF signal-conducting unit facing the plurality of movable electrodes when the plurality of movable electrodes are disposed at positions where the signal is switched on." This is not further limiting, there is no specific structure set forth or claimed.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-5 are rejected under 35 U.S.C. 102(e) as being anticipated by Ma et al. [US 6,686,820].

Claim 1, Ma et al. [figure 6B] discloses an RF-MEMS switch comprising:

a substrate[112];

an RF signal-conducting unit [110] arranged on the substrate;

a plurality of movable electrodes [140] having a space provided therebetween in a direction of signal conduction of the RF signal-conducting unit and arranged above the RF signal-conducting unit [144]; and

a movable electrode displacing unit [142] for displacing the plurality of movable electrodes at the same time in the same direction towards or away from the RF signal-conducting unit; wherein

when all of the plurality of movable electrodes are displaced in the direction away from the RF signal-conducting unit by the movable electrode displacing unit so as to be disposed at positions where a signal is switched on, conduction of an RF signal of the RF signal-conducting unit is switched on [col. 7 lines 20-35];

when all the plurality of movable electrodes are displaced in the direction towards the RF signal-conducting unit by the movable electrode displacing unit so as to be disposed at positions where the signal is switched off conduction of the RF signal of the RF signal-conducting unit is switched off [col. 7 lines 20-35]; and

an electrical length for the RF signal-conducting unit sandwiched between the plurality of movable electrodes [figure 6B].

Claim 2, Ma et al. discloses that the plurality of movable electrodes include a pair of movable electrodes, and when the pair of movable electrodes is disposed at positions where the signal is switched on by the movable electrode displacing unit, the electrical length for the RF signal-conducting unit sandwiched between the pair of movable electrodes is approximately equal to a quarter of the wavelength of the conducting RF

signal of the RF signal-conducting unit [col. 6 line 59 to col. 7 line 10 and col. 7 lines 20-35].

Claim 3, Ma et al. discloses a protective insulating film [148] provided on at least one of the surfaces of the RF signal-conducting unit, the surface of the RF signal-conducting unit being opposite to the surfaces of the movable electrodes [figure 6B].

Claim 4, Ma et al. discloses that the RF signal-conducting unit includes one of a coplanar line and a microstrip line, and the RF-MEMS switch is a shunt switching device for switching on or off the conduction of the signal of the coplanar line or the microstrip line functioning as the RF signal-conducting unit by utilizing a change in the capacitance between the movable electrodes and the RF signal-conducting unit [figure 6B, col. 7 lines 20-35].

Claim 5, Ma et al. discloses that the RF-MEMS switch is a switching device for switching on or off the conduction of the signal of the RF signal-conducting unit by one of separation and direct contact of at least a portion of the movable electrodes and the RF signal-conducting unit that face each other [col. 7 lines 20-35].

Claims 6, 9, 10, 12, 13, 16-18 are rejected under 35 U.S.C. 102(e) as being anticipated by Deligianni et al. [US 6,639,488].

Claim 6, Deligianni et al. discloses an RF-MEMS switch comprising;  
a substrate;  
an RF signal-conducting unit arranged on the substrate',  
a movable element disposed above the substrate with a space provided therebetween and facing at least a portion of the RF signal-conducting unit;

a plurality of movable electrodes arranged on the movable element and facing the RF signal-conducting unit; and

a movable element displacing unit for displacing the movable element in a direction towards or away from the substrate via electrostatic attraction; wherein

the plurality of movable electrodes is disposed with a space provided therebetween in the direction of signal conduction of the RF signal-conducting unit [figures 5 and 6]; and

the RF signal-conducting unit located between the plurality of movable electrodes defines a transmission line having a length that is less than or equal to a quarter of a wavelength of the conducting RF signal of the RF signal-conducting unit such that the RF signal-conducting unit located between the plurality of movable electrodes provides a characteristic impedance that is greater than a system impedance [col. 5 lines 4-30].

Claim 9, Deligianni et al. discloses that the RF signal-conducting unit includes a coplanar line, and the RF-MEMS switch is a shunt switching device for switching on or off the conduction of the signal of the coplanar line or the microstrip line functioning as the RF signal-conducting unit by utilizing a change in the capacitance between the movable electrodes and the RF signal-conducting unit [col. 5 lines 4-30].

Claim 10, Deligianni et al. discloses that the RF-MEMS switch is a switching device for switching on or off the conduction of the signal of the RF signal-conducting unit by one of separation and direct contact of at least a portion of the movable

electrodes and the RF signal-conducting unit that face each other [figure 6A, col. 5 lines 4-30].

Claim 12, Deligianni et al. discloses an RF-MEMS switch comprising;

a substrate;

an RF signal-conducting unit arranged on the substrate;

a plurality of movable elements disposed with a space provided therebetween in the direction of signal conduction of the RF signal-conducting unit, arranged above the substrate with a space provided therebetween, and facing at least a portion of the RF signal-conducting unit;

movable electrodes arranged on the corresponding movable elements and facing the RF signal-conducting unit; and

a movable element displacing unit for displacing the movable elements in the direction towards or away from the substrate using electrostatic attraction [figures 5 and 6]; wherein

the RF signal-conducting unit located between the plurality of movable electrodes defines a transmission line having a length that is less than or equal to a quarter of the wavelength of the conducting RF signal of the RF signal-conducting unit such that the RF signal-conducting unit located between the plurality of movable electrodes provides a characteristic impedance is greater than a system impedance [col. 5 lines 4-30].

Claim 13, Deligianni et al. discloses that the movable element includes a plurality of movable electrodes, and the plurality of movable electrodes are disposed with a space provided therebetween in the direction of the signal conduction of the RF signal-conducting unit [figure 6A].

Claim 16, Deligianni et al. disclose a protective insulating film [Ta<sub>2</sub>O<sub>5</sub>] provided on the RF signal-conducting unit the surface of the RF signal-conducting unit being opposite to the surfaces of the movable electrodes [figure 6A].

Claim 17, Deligianni et al. discloses that the RF signal-conducting unit includes a coplanar line, and the RF-MEMS switch is a shunt switching device for switching on or off the conduction of the signal of the coplanar line or the microstrip line functioning as the RF signal-conducting unit by utilizing a change in the capacitance between the movable electrodes and the RF signal-conducting unit [col. 5 lines 4-30].

Claim 18, Deligianni et al. discloses that the RF-MEMS switch is a switching device for switching on or off the conduction of the signal of the RF signal-conducting unit by one of separation and direct contact of at least a portion of the movable electrodes and the RF signal-conducting unit that face each other [figure 6A, col. 5 lines 4-30].

***Allowable Subject Matter***

Claims 8 and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.


**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bernard Rojas whose telephone number is (571) 272-1998. The examiner can normally be reached on M-F 8-4:00), every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Elvin G. Enad can be reached on (571) 272-1990. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
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